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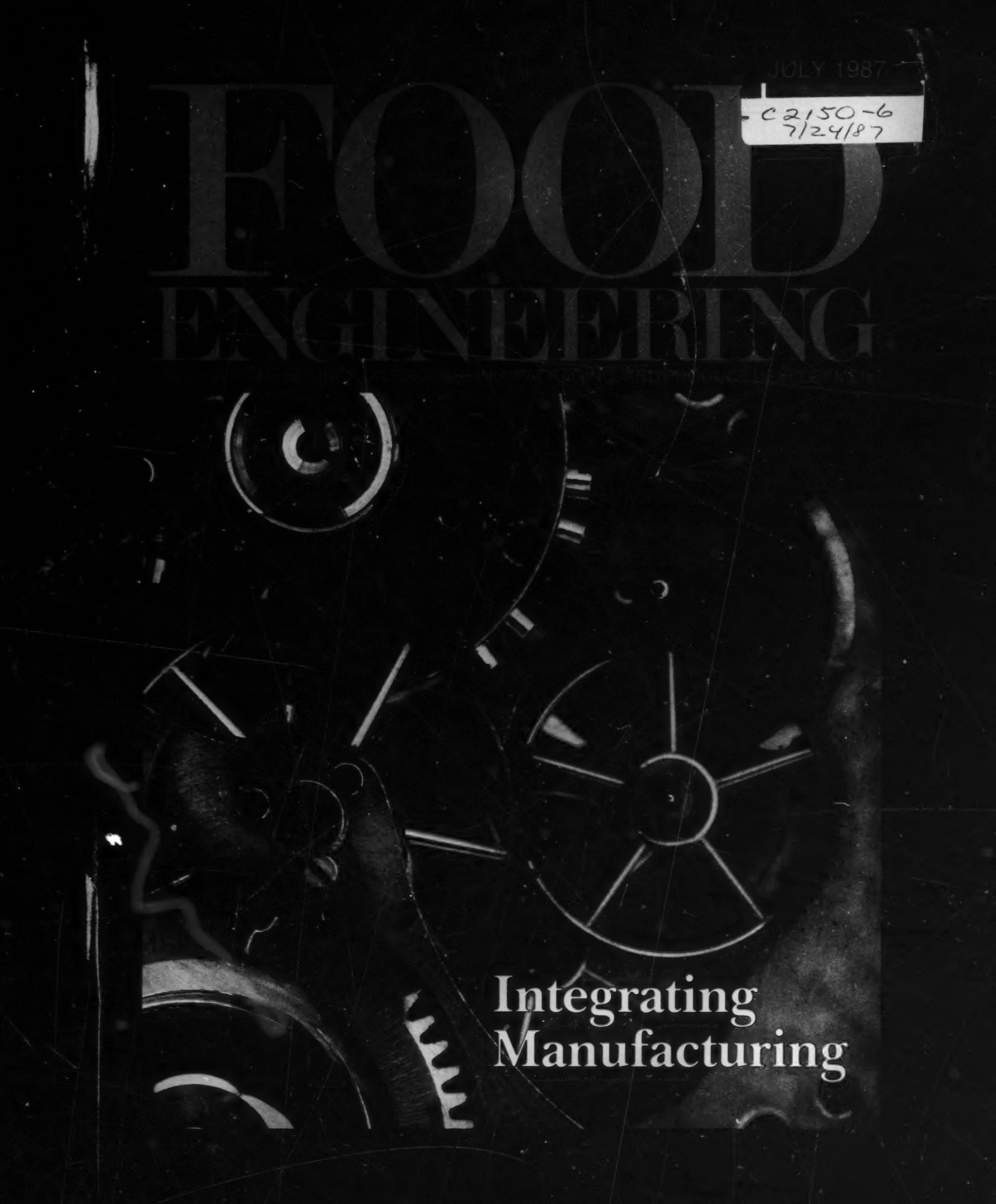

Integrating Manufacturing

FOOD ENGINEERING

COVER STORY
Computer integrated manufacturing (CIM) gives large companies access to information that is usually only possible in small organizations.

News

13 Industry Report
This month's Report talks about how the U.S. can battle European and Japanese trade policies; legislation on comprehensive food safety; USDA's research on sulfite alternatives; and problems with pesticide residue.

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Many people confuse integrated manufacturing with automation. Actually is is a way of thinking that takes you into a post-automation frame of mind.

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Manufacturers stress design features which boost reliability, cut costs and reduce maintenance.

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POSTMASTER: Send form 3579 to Food Engineering, Post Office Box 2035, Radnor, PA 19089.

Engineered Foods

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A new, low cost method has been developed to produce cyclodextrins which have the ability to encapsulate other molecules in their ring structure.

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This new enzymatic system aids in the maceration of fruits and vegetables into purees, concentrates, and juices.

45 Polydextrose
Candies and cough drops made with polydextrose and hydrogenated corn syrup have one-third fewer calories.

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New breeding methods have resulted in cattle which reach full size in a shorter time than traditional cattle, and have lower fat levels.

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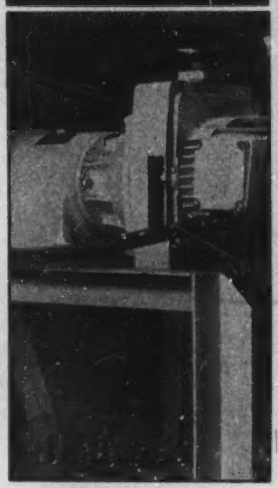

Special Emphasis

NEW DESIGNS FOR MOTORS AND DRIVES

Reliability and price are equally the most important factors in specifying motors for food plants and equipment.

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NAS pesticide residue report raises controversial issues

A report on pesticide residues from the National Academy of Sciences says that the current law which judges residues on raw foods by a less stringent standard than processed, is difficult to implement and does not provide the best protection of public health. Instead, the report proposes a uniform, "negligible risk" standard applied across the board to old and new pesticides on both fresh and processed foods in order to virtually eliminate potential dietary cancer risks from pesticides.

NAS stressed that the report does not comment on the safety of individual foods. However, the report did list the 15 common foods presenting the greatest risk of cancer because of the presence of 28 pesticides, based on theoretical worst-case estimates. For example, 8.75 out of every 10,000 people eating tomatoes over a 70-year lifetime will develop cancer from residues. This is followed by beef (at 6.49), potatoes (5.21), oranges (3.76) and lettuce (3.44).

Dichotomy exists

The Environmental Protection Agency commissioned the report as part of an effort to evaluate current regulations, The EPA calls the report "sound" and will respond formally in about 90 days. In the report, the NAS panel states that a dichotomy between raw and processed foods does not make sense and recommends removing the Delaney Clause which applies a zero-risk standard only to processed foods.

The National Research Council committee which drafted the report used a "worst-case" scenario in evaluating possible dangers from the use of pesticides. Dr. John Moore, assistant administrator of the EPA pointed out

(Continued on page 19)

NAS Theoretical Worst-Risk List

Food Item	Risk Factor*
Tomatoes	8.75
Beef	6.49
Potatoes	5.21
Oranges	3.76
Lettuce	3.44
Apples	3.23
Peaches	3.23
Pork	2.67
Wheat	1.92
Soybeans	1.28
Beans	1.23
Carrots	1.22
Chicken	1.12
Corn	1.09
Grapes	1.09

**Number of people per 10,000 over a 70-year lifetime, who will develop cancer from residues in the food listed.*

A controversial report from a National Academy of Sciences panel, using theoretical worst-risk estimates, listed fifteen common foods that present the greatest risk of cancer because of the presence of 28 pesticides.

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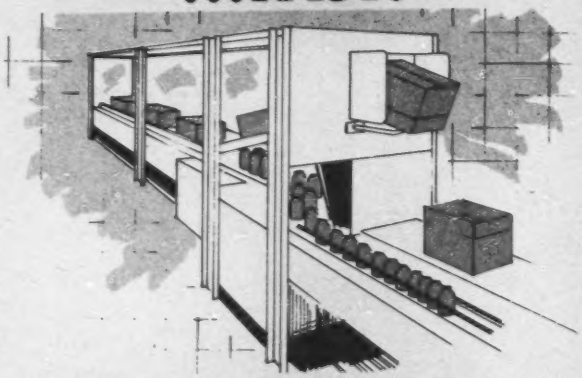

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Reduced calorie candies made without

Sucrose

More Americans than ever before are using reduced-calorie foods, providing opportunities for new products in this area.

As Americans increase their efforts to maintain an ideal weight, the availability of a wide selection of low-calorie food products becomes important to them.

While 65 million Americans (or 37 percent of the U.S. population 18 and over) are on diets, 78 million Americans age 18 and over consume low-calorie products. This was among the findings of a survey commissioned by the Calorie Control Council (CCC), Atlanta, GA. Conducted last year, the survey entailed 1,402 completed telephone interviews.

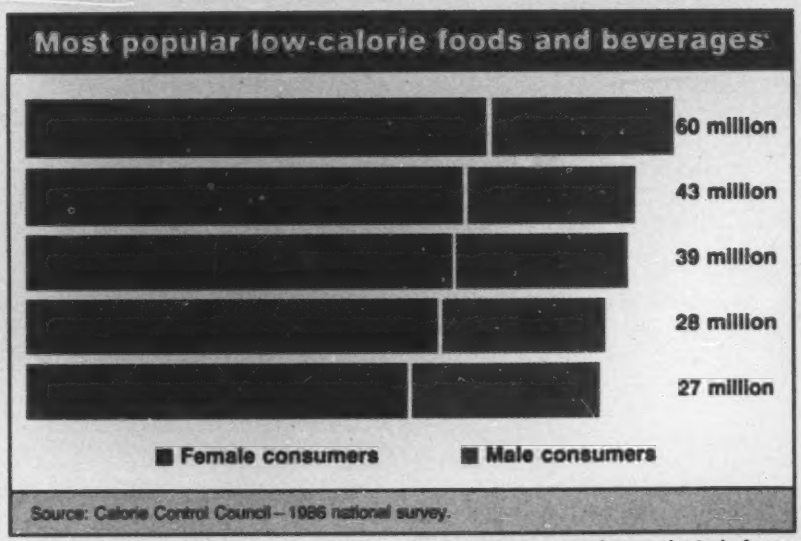
More low-calorie food users

The survey also showed that the majority (53 percent) of low-calorie product users began using these products within the last five years (35 percent within the last three years).

Staying in better overall health is the primary reason for using low-calorie foods and beverages for nearly three-fourths of the women consumers interviewed. Other important reasons, according to CCC, are: reducing weight (mentioned by 72 percent), maintaining current weight (mentioned by 71 percent), and maintaining an attractive physical appearance (mentioned by 70 percent).

Other findings of the survey were:

- The four most popular methods of dieting among the total population are cutting out certain foods containing sugar, starch or fat; exercise; using light foods and beverages; and using low-calorie products.
- 77 percent of low-calorie product users consume diet soft drinks: 55 percent – sugar substitutes, 50 percent – sugar-free candy/gum; 35 percent – sugar-free puddings and gelatins; 9 percent – sugar-free cakes and cookies; and 31 percent consume "other foods and beverages that contain a low-calorie sweetener."
- The majority (53 percent) of users would like to see additional low-calorie foods and beverages available. The most-mentioned additional products are (in order of priority) candy/gum, cereal, cakes, cookies, ice cream, and beverages/drinks.



Last year the Calorie Control Council commissioned a survey to be conducted of consumers attitudes about low-calorie, sugar-free foods and beverages. Above are some of the results.

With the number of people consuming low-calorie foods and beverages almost doubling in the past eight years, and with low-calorie food consumers asking for additional reduced calories, new product opportunities are expanding.

To assist food manufacturers in taking advantage of these opportunities, Pfizer Chemical Div., New York, has developed formulas for reduced-calorie, lite candies and cough drops made without sucrose.

The hard, lite candies are made using a patented combination of Pfizer's polydextrose and hydrogenated corn syrup (see accompanying formulation). These candies have one-third fewer calories than regular hard candies.

Pfizer has an option to license the

Continued on next page

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patents. An added benefit is these candies can be made using conventional candy-making equipment with no additional capital investment required.

High consumer interest

A market study was conducted on consumer reactions after sampling these candies. Five thousand consumers sampled and rated prototypes of lite candy. The results showed:

- 70 percent would purchase lite candy,
- 88 percent rated flavor as good or very good,
- 84 percent rated sweetness as good or very good, and
- 97 percent rated texture as good or very good.

When 1,288 consumers were asked to agree or disagree with the statement, "I would prefer to eat sugar-free candy instead of candy containing sugar," 76.1 percent said they strongly agreed. The 1986 estimated sales for hard candy are 550 million lbs., 430 million lbs. for soft candy, and 390 lbs. for panned candy.

Another application for polydextrose and hydrogenated corn syrup blend is reduced calorie soft candy—such as popular chewy gummy bears or the traditional soft jellies.

A market study was also conducted to determine consumer interest in a lite cough drop:

- 77 percent of those who purchased sugar-based cough drops were interested in the lite product concept,
- 64 percent said they would buy such a product,
- 62 percent would be willing to pay a premium, and
- About half would switch brands in order to buy a lite product.

A company which has already taken advantage of consumer interest in this area is Louis Sherry Corp., Parsippany, NJ. Its *Reduced Calorie Hard Candies* come in a fruit assortment and contains eight calories per piece. "Sugar Free will not promote tooth decay" appears on the front.

For more information, contact Pfizer Chemical Div., 235 East 42nd Street, New York, NY. Or circle 287 on the reader service card.

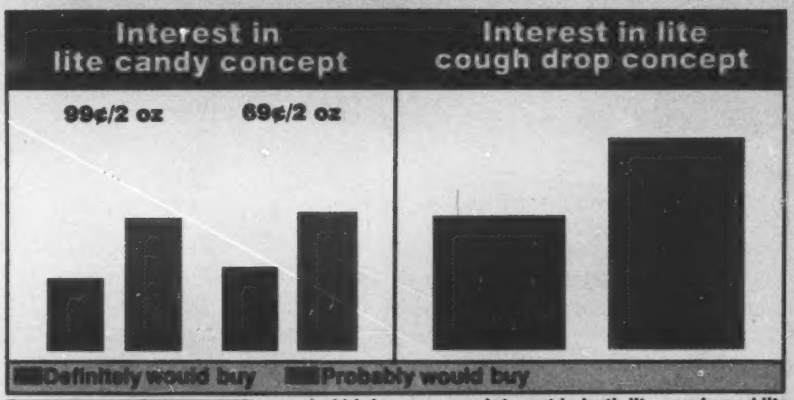
Reduced calorie hard candy

Ingredients	percent
Hydrogenated corn syrup (75% solids)	61.8
Polydextrose, powder (Pfizer)	37.8
Citric acid, anhydrous (Pfizer)	0.2
Flavor	0.1
Color	0.1
	100.0

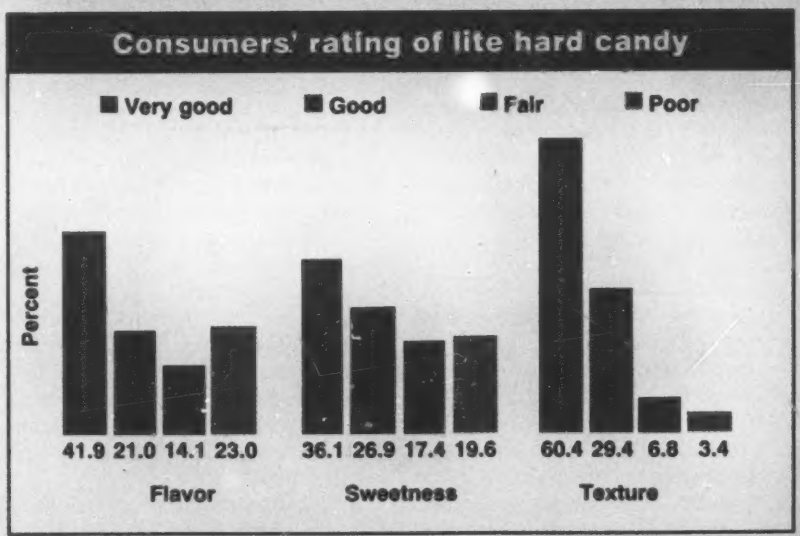
Procedure

1. Add the hydrogenated corn syrup and polydextrose to a vacuum cooking vessel and heat to 310°F at a vacuum of 29 inches.
2. Remove mixture from cooker and allow to cool to 250°F.
3. Add citric acid, flavor, and color to mixture and blend.
4. Transfer batch to a cold slab for further cooling. Knead until uniform.
5. Use conventional candy equipment to form finished pieces.

The above chart shows one of the formulas developed by Pfizer, Inc. which uses polydextrose in candies.



Consumer market research revealed high consumer interest in both lite candy and lite cough drop concepts.



1,290 individuals sampled lite hard candies made with polydextrose. How these consumers rated the candy's flavor, sweetness, and texture is shown.